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[Claim(s)]

[Claim 1] In the ultrasonic diagnostic equipment which displays an ultrasonic picture by the transmission-and-reception wave of an ultrasonic wave An extraction means to extract the image data in the reference area appointed within a picture, A reference value calculation means to compute the reference value which shows the present picture state based on the image data in said extracted reference area, Ultrasonic diagnostic equipment characterized by including a disused judging means to compare with said reference value the disused decision value set up beforehand, and to judge a disused state, and the power supply interception means which turns OFF the power supply of equipment itself or the specification circuit in equipment when said disused judging is carried out.

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to ultrasonic diagnostic equipment, especially the ultrasonic diagnostic equipment which can turn OFF the power supply of equipment itself or the specification circuit in equipment based on a picture state.

[0002]

[Description of the Prior Art] The transmission-and-reception wave of the ultrasonic wave is carried out to a living body, and the ultrasonic diagnostic equipment which displays a tomogram in the living body by this is known. In this ultrasonic diagnostic equipment, the transmission-and-reception wave of an ultrasonic wave makes an ultrasound probe contact a living body, and is performed, the ultrasonic wave generated with the ultrasonic transducer stored by the ultrasound probe is transmitted by the living body, and the reflective wave from in the living body is received with said ultrasonic transducer. Thus, the taken-in received signal is processed by the main part of ultrasonic diagnostic equipment, and, finally is displayed on CRT for image display as an ultrasonic picture.

[0003]

[Problem to be solved by the invention] There is a tendency to deteriorate although there are most probes for ultrasonic diagnostic equipments manufactured now then gradually according to accumulation of a hour of use.

[0004] Moreover, CRT for image display is a kind of an electron tube, and degradation of a fall of contrast etc. occurs according to accumulation of a hour of use.

[0005] Although these two portions are main parts of ultrasonic diagnostic equipment, its degradation of performance is earlier than other portions like the above. Therefore, at the time of disuse, it is useful for degradation prevention of ultrasonic diagnostic equipment to turn off a power supply as much as possible.

[0006] However, in conventional ultrasonic diagnostic equipment, since it did not have a reset function after predetermined time progress, it is neglected switching on the power supply of ultrasonic diagnostic equipment, although it was in the disused state, and there was a problem of bringing forward superfluously degradation of an ultrasonic transducer, CRT for image display, etc.

[0007] In the state of disuse [equipment], although the switch of a power supply is

turned OFF by the operator, when a failure of a power supply to cut etc. arises, the above-mentioned problem usually occurs.

[0008] This invention is made in view of the above-mentioned conventional technical problem, and the purpose is in offering the ultrasonic diagnostic equipment which can turn OFF automatically the power supply of equipment itself or the specification circuit in equipment, when ultrasonic diagnostic equipment is in a definite-period-of-time disused state.

[0009]

[Means for solving problem] In the ultrasonic diagnostic equipment as which this invention displays an ultrasonic picture by the transmission-and-reception wave of an ultrasonic wave in order to attain the above-mentioned purpose An extraction means to extract the image data in the reference area appointed within a picture, A reference value calculation means to compute the reference value which shows the present picture state based on the image data in said extracted reference area, The disused decision value set up beforehand is compared with said reference value, and it is characterized by including a disused judging means to judge a disused state, and the power supply interception means which turns OFF the power supply of equipment itself or the specification circuit in equipment when said disused judging is carried out.

[0010]

[Function] According to the above-mentioned composition, a reference area is appointed in a screen and the image data in the reference area is extracted. A predetermined reference value is computed based on the extracted image data. Here, this reference value can consider what added or equalized the image data in a reference area, for example. And the disused decision value set up beforehand is compared with said reference value, and since it is judged with a disused state when a reference value is within a disused decision value, the power supply of equipment itself and the specification circuit in equipment is turned OFF by a power supply interception means.

[0011] That is, the ultrasonic picture displayed does not change but this invention makes this the judgment material of a disused state using the thing of only some noises being included almost been in a dark color state, when ultrasonic diagnostic equipment is in a disused state.

[0012]

[Working example] The suitable work example of this invention is hereafter explained based on Drawings.

[0013] The ultrasonic picture histogram is shown in drawing 2 . When an area is set as the place distant for a while instead of directly under [probe], in the state of probe disuse, it becomes the graph near [like a histogram 101] 0 gradation sequence at the time of disuse, and the average value 102 turns up for a while from a peak. At the time of use, although there are some differences by setup of a diagnostic part and an area, it becomes graph like a histogram 104 fundamentally at the time of use, and the average value 105 is mostly in agreement with a peak. Since there is a difference clear by average value 105 at the time of average value 102 and use at the time of disuse so that more clearly than this graph, if a decision value 107 is set up between them, it can judge by the average value of the image data in an area.

[0014] The important section composition of the ultrasonic diagnostic equipment concerning this invention is shown in drawing 1 .

[0015] The received signal outputted from the ultrasound probe which is not illustrated is once written in a frame memory 10, after predetermined processing is performed.

Although the image data for one picture is stored in this frame memory 10, the image data in a specific area is read by operation of the area setting circuit 12 among those for that one sheet. This read image data is sent to the equalization circuit 14.

[0016] The equalization circuit 14 equalizes the image data in an area, and computes the reference value used as the judgment material which hits judging the disused state of equipment. When accumulation addition of the all is carried out by operation with an adding machine 16 and the latch circuitry 18 established in the latter part and each image data divides an addition result by the number of data by the dividing circuit 20, specifically, average value is calculated. In addition, in this work example, the area is set up in the size of the M pixel xN pixel, the area setting circuit 12 has read the image data of MxN, and, on the other hand, as for the dividing circuit 20, division of the addition result is done by MxN.

[0017] The reference value which is the division result outputted from the equalization circuit 14 is sent to the judgment circuit 22. A reference value is supplied to the input terminal B of the comparison machine 24, and, specifically, on the other hand, the decision value is inputted into the input terminal A. It is used in order to judge that this decision value has ultrasonic diagnostic equipment in a disused state.

[0018] Therefore, if a reference value is lower than a decision value, the comparison machine 24 sets a judgment signal to "L", and when [that] reverse, it will make a judgment signal "H". When a judgment signal is "H", a timer 26 always sets in the reset state, and the clock 100 supplied from the outside does not count. On the other hand, when a judgment signal is set to "L", the reset state is dispelled and a timer 26 counts a clock 200. When the count value reaches to a predetermined value, a timer 26 outputs the judgment signal 201. Here, the predetermined value is a desired period until it turns OFF a power supply.

[0019] This judgment signal 201 is sent to the power supply interception circuit 28. Specifically, the flip-flop 30 prepared in the power supply interception circuit 28 makes the output 102 "H", when the judgment signal 201 is inputted. Then, a transistor 32 will be in an ON state, the electromagnetism switch 34 opens wide with this, and the DC power supply 35 is turned OFF. This DC power supply 35 supplies the power supply to each circuit in equipment, and ultrasonic diagnostic equipment is turned OFF on substance.

[0020] On the other hand, when restarting ultrasonic diagnostic equipment, by turning ON the restart switch 36, a flip-flop 30 will be reset and a flip-flop 30 will be again set in the input standby state of the judgment signal 201.

[0021] Therefore, since the ultrasonic picture displayed on a monitor will almost be in a dark color state only by some noises being included when ultrasonic diagnostic equipment is in a disused state, the concentration change is detected, and when the state carries out definite-period-of-time continuation, the power supply of ultrasonic diagnostic equipment can be turned OFF. Therefore, bringing forward superfluously the life of CRT for image display or an ultrasonic transducer is avoided.

[0022] In addition, as for the area appointed in the area setting circuit 12, it is desirable to set it as the depths (distant place) instead of directly under [with comparatively many picture top noises / probe]. Moreover, although the image data in an area was equalized

and the average value was made into the reference value which is in charge of a disused state judging in this example, it asks for the peak in an area and is good also considering it as a reference value.

[0023] Furthermore, in this example, although the power supply of equipment itself was turned OFF except for the power supply for a restart, you may turn OFF the power supply of the specification circuit in equipment, without turning OFF the whole equipment. For example, the supply circuit of the transmitted signal to an ultrasound probe, the power supply of CRT for image display, etc. may turn OFF only the circuit which produces a degradation problem.

[0024]

[Effect of the Invention] Since a disused state can be judged based on the image data in a reference area according to this invention as explained above, degradation of an ultrasonic transducer, the power supply of CRT for image display, etc. can be prevented. Moreover, since a power supply can turn OFF automatically, it is effective also as safety measures.

[Brief Description of the Drawings]

[Drawing 1] It is the block diagram showing the important section composition of the ultrasonic diagnostic equipment concerning this invention.

[Drawing 2] It is the explanatory view showing the histogram of an ultrasonic picture.

[Explanations of letters or numerals]

12 Area Setting Circuit

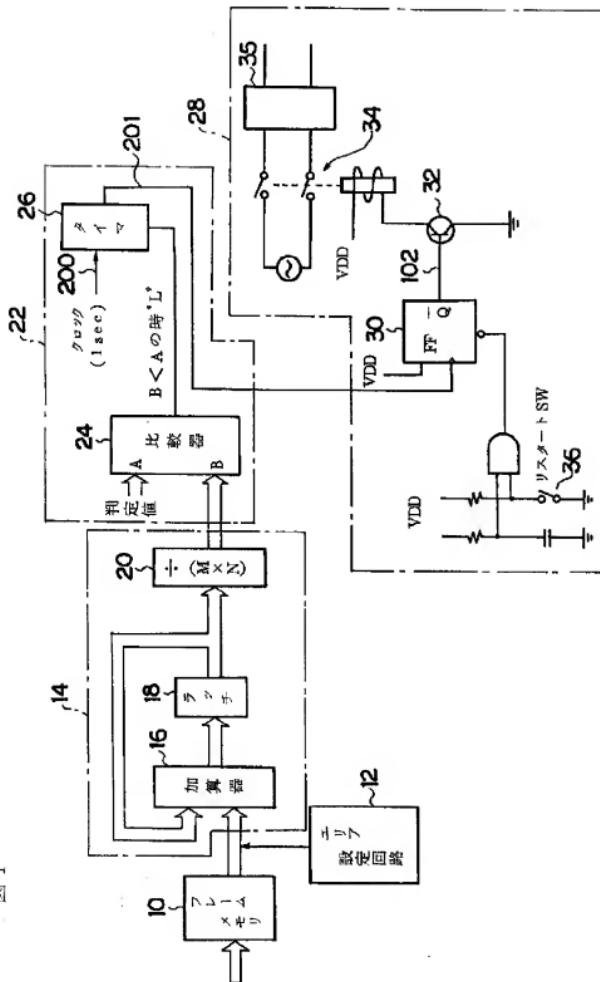
14 Equalization Circuit

22 Judgment Circuit

28 Power Supply Interception Circuit

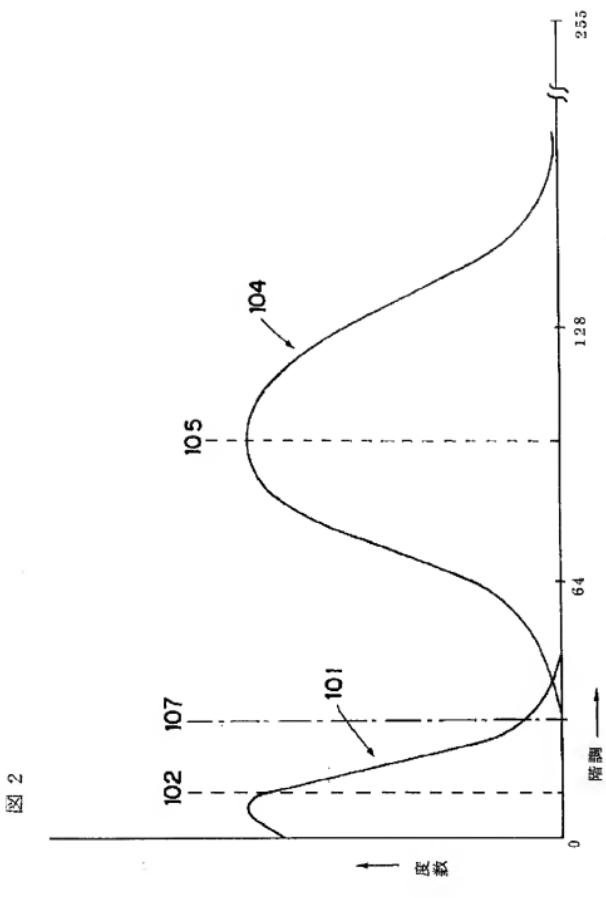
[Drawing 1]

図 1



[Drawing 2]

図 2



[Translation done.]